DEVELOPMENT OF E-COLLABORATIVE MANAGEMENT MODEL FOR TEACHING AND LEARNING ACTIVITIES: AN ACTION RESEARCH IN MALAYSIA

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ABSTRACT

The present study is using qualitative research method to develop a model for e-collaborative management on teaching and learning contents (TLC) for a private university college. The model operates on up-building and sustaining competitive niche for higher education institutions (HEI). Participatory action research (PAR) method is applied to fifteen participants across different faculties and academic supporting departments. Those participants are lecturers, department heads, deans and academic supporting colleagues. Advocating, adapting, and aligning are the three continuous revolving spiral improvement actions applied to reflect cycles employed to promote e-collaborative management on TLC. Data were obtained through participant observation, in-depth interviews, and document triangulation of data sources. The purpose was to construct, synthesize, develop, and justify the model. The findings shows "cooperative working behavior", "guidance collaborative process", "substantial reciprocal practice" and "conclusive common goals" as four motivating factors functioning as enablers, facilitators, mechanisms, and drivers respectively to inspire e-collaborative management on TLC process. These four factors consequently "foster collective action practices" and "work toward common objectives" to promote e-collaborative management on TLC. This study advances ideas on how to group the right profession, recruit right partner, catch right timing, and make right setting. The practical implications are the discovery of theoretical, personal, and workplace practical best practices in relation to e-collaborative management on TLC.

Keywords: e-Collaborative Management, Teaching & Learning, Action Research, Education, Malaysia

INTRODUCTION

The legacy of administrative policies, rules, procedures and mandated controlling approaches are not the most effective and efficient management approaches to be used by knowledge-based organizations, societies, and economies. This phenomenon also exists in the HEI, especially in teaching and learning activities. Enforcing a management approach or administrative policy method to build and maintain teaching and learning contents (TLC) may spoil the collaborative relationships among lecturers, deans and administrative supporting colleagues. Although human behavior and the work culture can change through enforcement, they usually just comply with the management's instructions.

TLC is one of the critical input resources for any HEI to deliver its curriculum. It is accumulated from various sources of professional knowledge, case studies, lessons learnt, best practices, practical know-how, lecturers' experiences and others. TLC formats include lecture notes, study guides, illustration slides, audio and video material (Seldin, 2004) used to disseminate knowledge and skills (MQA, 2008). These TLC are unstructured soft-copies data prepared by lecturers with professional expertise and domain of subject knowledge. They are prepared using text books from overseas or developing countries but adapted to the local social setting, cultural and educational goals.

The Internet has created a new way of managing and integrating people which is coined as e-collaborative management. In the HEI, e-collaborative management is commonly used in managing TLC (Southern, 2013). However, e-collaborative management on TLC is often unsatisfactory (Southern, 2013), including that of HEI in Malaysia (Grapragasem, Krishnan, & Mansor, 2014). This highlights the need for understanding what factors motivate HEI colleagues to participate in e-collaborative management on TLC by collecting, updating, sharing, maintaining and auditing the Collaborative Information System (CIS).

Ineffective and inefficient e-collaborative management may cause varying degrees of negative impacts on the HEI and its stakeholders. To start with, TLC becomes difficult to retrieve, not up to date, inconsistent in version, inadequate, and obsolete when needed for sharing, updating and auditing. Next, TLC is not complying with the Malaysian Qualifications Agency (MQA) standards in terms of program quality. This will result in the loss of program accreditation and student inability to obtain loans. In addition, poor TLC for curriculum delivery will make existing students advertise the fact through word of mouth, thus creating a bad image among prospective students. Finally, decreasing quality of TLC will decrease the TLC delivery quality among novice lecturers. In short, the HEI may lose its competitiveness in education markets if it fails to manage collaboration in TLC activities effectively and efficiently. Competition among HEIs will make the abovementioned problems more serious.

Based on the abovementioned articulated problem statement, the following research questions have been developed to guide this research: (1) What are the motivating factors in e-collaborative management on TLC process? (2) Why should one use these factors to promote e-collaborative management on TLC in the HEI? (3) How do these factors inspire e-collaborative management on TLC in the HEI? These research questions are to explore the problem of "how to create, conduct and improve e-collaborative management of TLC" and accomplish the "development of e-collaborative management on TLC model" goal. These research questions are also asked in order to achieve comprehensively organized TLCs for the HEI, and shape its e-collaborative management on TLC model.

LITERATURE REVIEW

e-Collaborative Management

Pasmore, Stymne, Shani, Mohrman, and Adler (2008) defined management as a system behavior that looks forward to influence a person or collective group to perform. According to the National Economic Development Committee for Inuit Nunangat (NEDCIN), collaborative or co-management is a process of sharing several common key elements at the workplace (NEDCIN, 2009). e-Collaborative management exploits the information and communication technologies (ICT) to conduct collaborative management tasks. Wikipedia is a form of e-collaborative management to accumulate global knowledge, know-how and experience. Reagle (2010) highlighted that individuals are adopting online, asynchronous, possibly anonymous, incremental, and cumulative ICT tools to work together in Wikis.

Kock, Davison, Wazlawick, and Ocker (2001) championed e-collaboration which applies electronic technologies for collaboration among those engaged in joint projects. It allows individuals to communicate within the group regardless of geographical distance, duration and occasion by using electronic devices to accomplish a common task (Kock, 2007). Moreover, collaboration involves more than one stakeholder or interested party to engage their tangible and intangible resources to solve an intricate problem (Gray, 1989). Shah (2012) stated that e-collaboration complements each other's competence to attain the whole synergy greater than sum of its parts in achieving shared goals or solving an intricate problem.

To recapitulate, the present study defines e-collaborative management as a cross function of administrative colleagues with shared goals that enables them to plan, organize, lead, and control collective tasks for shared interests using ICT. It manages e-collaboration and collective tasks through CIS. It also manages multiple entities or parties for sharing their knowledge, talents, skills, information, risks, and resources in the CIS to achieve their shared goals. It is contributing to organizational development and growth.

Emerging e-Collaborative Management Technologies

A systematic management practice is required to deliver persistent and well-indexed tools for collaborative knowledge management, social and knowledge network analysis in an organization (Jones, 2001). This systematic practice tool is adequate for monitoring organizational performance, anticipating and attending to feedback and outcome measures, designing the change avenues, and then taking action effectively. It ensures information technology supports organizational learning. Hence, Bessagnet, Schlenker, and Aiken (2005) stated that e-collaborative technologies significantly leverage management efficiency through the CIS platform on which individuals and teams share knowledge and communicate collaboratively.

Microsoft SharePoint is one of the e-collaborative technologies for organization-wide CIS. It seamlessly fosters well-being collaborating team, health working environment and organizational culture through enriched information sharing (Sampson, 2009). The Microsoft SharePoint information sharing function accelerates collaborative organizational knowledge sharing, updating, preserving, and work flowing (Campbell & Brown II, 2012). A mature and energetic collaboration platform could give big result on a low budget if it is fully utilized through diffusion of innovation and training (Rogers, 1983).

Existing e-Collaborative Management Study

University of Maryland University College deployed a university-based model in knowledge sharing environment for promoting research and scholarship activities (Liebowitz, 2012). Similarly, the Defense Acquisition University applied the Experience Management Portal using Empirical Results as Organizational Resources (EMPEROR) tool to collect experience reports on practice applications (Becker-Kornstaedt & Shull, 2012). These experiences are shared by the practitioners. The experts worldwide collaboratively and constructively handled, summarized, and interpreted the experience reports according to their experience. Both cases promote collaboration by developing new ways of synthesizing and generating new pragmatic approaches.

Kezar and Lester (2009) have developed a collaborative context in HEI which consist of building commitment, implementing commitment, and sustaining commitment stages. Furthermore, Walsh and Kahn (2010) proposed a collaborative working model in higher education that contains factors of context, practice, professional dialogs, engagement, and social vehicles. However, the researchers found that earlier models are emphasizing on human relationship building, goal oriented team working, and organizational structure design. Little consideration has been given to the contemporary ICT collaborative working environment. Hence, the present study attempts to fill the gap by extending previous findings and collaboration from the perspective of TLC in the HEI. It synthesizes collaboration, e-collaboration and management concepts, perspectives and studies. It aims at deploying the e-collaborative management on TLC for HEI.

The present study finds five types of knowledge gap in literature review, namely, knowledge-based, relationship-based, theory-based, methodological and analytical gaps (Murray & Beglar, 2009). Please refer to Table 1 for details. The researchers add the potential gaps of e-collaborative management study on TLC for HEI. There is undiscovered knowledge-based gap in e-collaborative management, relationship-based gap is using social technology for e-collaborative management, theory-based gap in e-collaborative management within HEI colleagues, methodological gap is using participatory action research (PAR), and analytical gap is using grounded theory approach.

Table 1

Five Types of Gaps for e-Collaborative Management on TLC Study

No	Types	Description	Potential gaps
1	Knowledge-based	Phenomenon little known or unknown	Rare in e-collaborative management on TLC for HEI faculty
2	Relationship-based	Unsure variables' relationship on certain well reasonably variables	Rare in using social technology for e-collaborative management
3	Theory-based	Uninvestigated thoroughly or untested in particular context or individual group	Rare in HEI colleagues use of e-collaborative management
4	Methodological	Unapplied research design or methodology to the phenomenon	Rare in using PAR for e-collaborative management study
5	Analytical	Unapplied analytical approach to the phenomenon	Rare in using grounded theory approach for coding and develop e-collaborative management model

(Source: Adapted from Murray & Beglar ,2009).

Underlying Theories and the Way Forward

The present study is based on negotiated order theory (Strauss, 1978), social exchange theory (Blau, 1964), and work system theory (Alter, 2013) to accomplish the collaborative management process. Santos, Santoro, and Borges (2008) mentioned that negotiated order is a process of people mutual adjustment and interpretation to have a coherence of understanding and actions. Consequently, Gray (1989) stretched negotiated order theory to construct collaboration theory. But, it lacks the socio-economic perspective of social exchange theory (Blau, 1964) that is rooted in economics. Di- Domenico, Tracey, and Haugh (2011) assumed that individuals engaged in social exchange because of the need or desire to acquire intrinsic or extrinsic rewards. These rewards are unable to be obtained by themselves.

Work system theory is to be reckoned as complementing negotiated theory and social exchange theory on the process of negotiated order and social exchange protocol. Alter (2013) used work system theory as an action project work system approach to connect collaborated participants, curriculum contents, collaboration information systems or computer support cooperative work system for e-collaborative teaching and learning management.

The present study aims at extending the Kezar and Lester (2009) HEI collaboration model in the electronic collaborative working platform; the Ansell and Gash (2007) collaborative governance model; Gray (1989) collaboration theory; and to further develop the Walsh and Kahn (2010) HEI collaborative working model on electronic dynamic collaborative management process model. Based on the preceding review, preliminary e-collaborative management process proposes the use of PAR (refer to
able 2) to explore the e-collaborative management context. The discussion on PAR is offered in the next section.

able 2
Preliminary Participatory Action Research Guideline for e-Collaborative Management on TLC Study

Evolution Route	Evolvement from theories into practices
1)Underlying theories	1) Negotiated order theory for catalyzing e-collaborative management deployment. 2) Social exchange theory for sustaining e-collaborative management practice. 3) Work system theory for leveraging e-collaborative management performance.
2) Strategy in e-**collaborative management process**	1) Catalyzing collaboration by convenience collaborative working environment (CWE) and CIS (technology); 2) Proactive helping attitude, friendly relationships, capability and competency of individual from complementary support members (participants); 3) Allocating organizational resources and sharing personal practices for TLC (information)
3) Importance of initial conditions	1) Strategies (facilitating & coaching); 2) Infrastructure (sufficient resources); 3) Environment (cooperative culture)

4) Stages of development	1) Envisioning on individual and HEI competitive advantages. 2) Co-constructing on common goal, adaption, and collective accountability. 3) Appreciating on reciprocal learning, doing, and synergizing. 4) Sustaining for effective e-collaborative management.
5) Participatory action research cycles	1) Advocating cycle through envisioning and co-constructing e-collaborative management on TLC project. 2) Adapting cycle with co-constructing and appreciating e-collaborative management on TLC effort. 3) Aligning cycle on appreciating and sustaining community of e-collaborative management on TLC practice.

(Source: the authors)

METHOD

Research Scope

This is a case and focus group study with a scope restricted to lecturers, department heads, deans and academic supporting colleagues who engage in e-collaborative management on TLC in a private university college. The researchers are not building an e-collaborative management on TLC team but encouraging all about fifteen colleagues involved in the present study. They come from various faculties and academic supporting departments including Faculty of Art and Design (FAD), Faculty of Engineering and Information Technology (FEIT), Faculty of Humanities and Social Science (FHSS), Computer Centre Office (CCO), Planning and Development Accreditation Office (PDA), Centre of Innovation for Teaching and Learning (CiTL). They are key representatives of research selective sample for e-collaborative management in the university college. It is because they are critical actors playing different roles to drive and support this e-collaborative management on TLC process.

Underpinning Philosophical Assumption

The present study uses qualitative interpretive research (Klein, 2012). It aims at seeking meanings and understandings about e-collaborative management on TLC practices, and to generate a new theoretical model for e-collaborative management context-bound by the university college's TLC management. This e-collaborative management study process involves various functional departments, professional individuals equipped with different intentions, interests, skills and knowledge. Thus, interpretive research is appropriate for understanding participants' motives, actions, and intentions (Saunders, Lewis, & Thornhill, 2012) and to understand what is happening in the social situations in social exchange and negotiate meanings on an agreed-upon order (Mcniff & Whitehead, 2011). Moreover, the researchers and practitioners collaborate for practical judgments and solutions (Willis, 2007). Although the qualitative data collecting approach is more subjective, inter-subjective dialog makes e-collaborative management studies more workable.
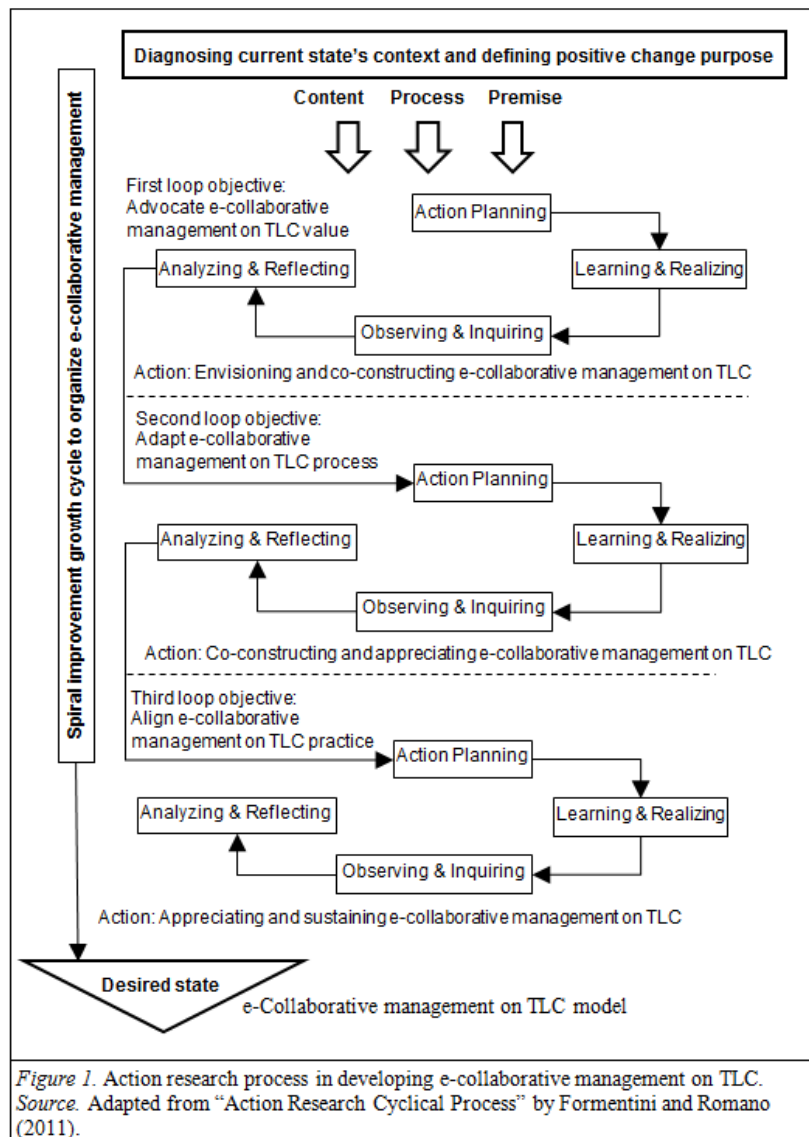
Participatory Action Research

PAR fits the present e-collaborative management on TLC study because of its collaborative characteristic, which involves inter-subjective relationships. James, Milenkiewicz, and Bucknam (2008) mentioned how the PAR process in its iterative cycles encourages people to work collaboratively and seek democratically derived solutions to problems and produces new knowledge from personal and professional lessons learnt.

O'Brien (1998) emphasized that action research is an ongoing process by which knowledge is derived after review of practice learned from previous experience. The present study integrates the Denscombe (2010) with Coghlan and Brannick (2010) action research models into a four-phase cycle, namely, action planning, learning and realizing, observing and inquiring, analyzing and reflecting. The spiral of three action cycles as illustrated in **Error! Reference source not found.** improves e-collaborative management.
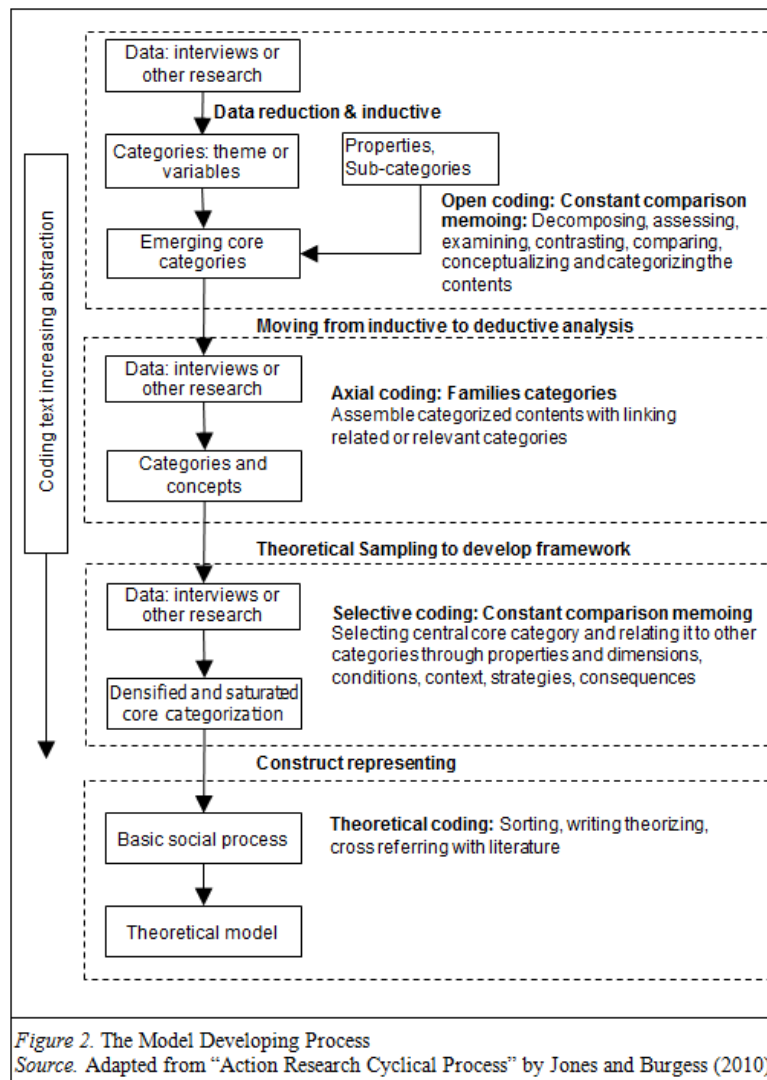
In addition, the four stages of development are envisioning, co-constructing, appreciating, and sustaining. The envisioning stage promotes what might be individual competence and the university college competitive advantages through advocating action in the first PAR cycle, the co-constructing stage diffuses what should be common goal, adaption, and collective accountability through advocating and adapting action in the first and second PAR cycles; the appreciating stage reinforces and values the best of what is reciprocally learning, doing, and synergizing through adapting and aligning action in the second and third PAR cycles; and the sustaining stage systemizes what will be effective e-collaborative management through aligning action in the third PAR cycle.

Figure 1. Action research process in developing e-collaborative management on TLC.
Source. Adapted from "Action Research Cyclical Process" by Formentini and Romano (2011).

Data Collection and Coding

The present study uses data triangulation, which consists of observation, in-depth interview, and document data mining. These three collection techniques are conducted in parallel to complement each other's weaknesses. In-depth interviews were conducted on each action cycle during the observing and inquiring phase in three iterative action processes. Participant observation was to learn how people act and interact in e-collaborative management practice. The document data mining process provides a systematic procedure for identifying, analyzing, categorizing, and deriving meaningful data from documents. They are carried out consecutively during this entire research period; for example, documents data mining on the artifact of e-collaborative management complements in-depth interview and observation. This helps to dig more deeply into e-collaborative management practice and human behavior. **Error! Reference source not found.** presents the progress of the data analysis from open encoding, axial encoding, selective encoding, to theoretical encoding. Richards and Morse (2007) stated that qualitative data analysis starts with the sorting out of collected encoded research data in order to identify the variables.

Figure 2. The Model Developing Process
Source. Adapted from "Action Research Cyclical Process" by Jones and Burgess (2010).

FINDINGS

Advocating e-Collaborative Management on TLC Value

We urge urged participants to share common ground to envision this e-collaborative management on TLC as a benefit to themselves and all others. Using the co-construct e-collaborative management on TLC model, collaboration relationships and skills are developed. Teamwork spirit not only accomplishes the e-collaborative management on TLC project goals but also develops an individual's own competence. Four findings are interpretable from the action research process findings. First, computer center colleagues mention that *"securing the TLC and sharing it is a value to the university college"* (initiative system support). This TLC is flowing across faculties and academic supporting departments. They need e-collaborative management on TLC colleagues to take care of it as with monetary assets.

Second, PDA colleagues mention that *"synchronizing TLC to ensure the availability, consistency, accuracy, credibility and validity of TLC is important to the university college"* (leads to collaboration). Therefore, the university college needs e-collaborative management on TLC in order to provide high level quality education management. Third, CiTL colleagues mention that *"developing and synthesizing TLC could promote TLC improvement opportunities"* (knowledge exchanging and leveraging). Different disciplines and different lecturers have their own style of authoring TLC. Fourth, faculty colleagues mention that *"e-collaborative management on TLC increases cohesive work among colleagues and academic supporting departments"* (intimate friendly communication). The lecturers know each other's TLC and this makes learning overlap and interlace.

Adapting e-Collaborative Management on TLC Process

Adapting is the key to sustainability (Graves & Marston, 2013). Adapting is to serve an ever-changing set of community and donor priorities, focusing on the impact today and in the future. It is to evoke cohesive teamwork among e-collaborative management on TLC participants. The researchers and participants together co-construct the e-collaborative management on TLC process at this stage. Positive thinking and appreciating each other's tactics are used to build e-collaborative management on TLC process. There are four interpretations possible from the action research process findings. First, TLC needs to have tightly linked and secure storage to verify that TLC really involves organizational assets and intellectual property. This requires a highly reliable, efficient, and accessible CIS software, hardware and support team. Moodle is a Shareable Content Object Reference Model (SCORM) compliance open source course management system. TLC in SCORM has reusability, accessibility, interoperability, and durability.

Second, PDA colleagues highlight *"e-collaborative management on TLC as pivotal for controlling every subject's TLC changes and its progress"* (accumulating teaching and learning resources). This means that a current TLC definitely has impact on the students' capability and competence. Third, CiTL colleagues are taking care of TLC as organizational knowledge management and making SharePoint an organizational memory device. This allows TLC to contribute more to innovative teaching and learning development. They are going beyond their CiTL colleagues' duties and responsibilities. Fourth, a faculty colleague's TLC preparation for every semester exhibits his or her advancement of the organization of teaching activities. These activities definitely help their learners' progress in TLC.

Aligning e-Collaborative Management on TLC Practice

The researchers are aligning human and ICT resources to establish e-collaborative management on TLC best practice. First, the researchers encourage participants to appreciate each other's collaboration efforts. Next, the participants are assisted in inventing best practice of e-collaborative management on TLC. This is followed with the process of cultivating the collaborative management community. Four interpretations can be made from the findings of the listed aligning action process. First, computer center colleagues commit to *"continuously improve both Moodle and SharePoint portal accessibility"* (positive thinking and action), which exhibits their contributions to e-collaborative management on TLC. Continuous application of their ICT knowledge and skills shows their devotion to the e-collaborative management on TLC. Their commitment to quality services boost effectiveness of e-collaborative management on TLC. Second, when PDA colleagues are keen to train, audit and advise faculty colleagues in syllabus writing and TLC development, the consistency in syllabuses and TLC to comply with MQA and other external audits is increased.

Third, CiTL colleagues are creating more resources for faculty colleagues to produce quality TLC, and by doing so show they have an excellent relationship with faculty colleagues. Their willingness in helping faculty colleagues produce better performance in TLC composition and delivery shows their team collaboration spirit. Fourth, faculty colleagues are given role models for creating, updating, sharing and exchanging knowledge of TLC. This increases writing quality and in turn attracts TLC followers and cultivates more collaborative colleagues in the community of e-collaborative management on TLC.

Data Analysis and Synthesis

We make reflections and get lessons learnt from the described interviews, observations, and document mining. These combined sources of data are more comprehensive, cumulative, credible, reliable and valid. We have used this triangulation of data sources to compare, contrast, consolidate, integrate and synthesize in order to have succinct, concise, and coherent transcripts for developing an e-collaborative management on TLC model. The holistic picture of the research effect can now be tabulated in the Appendix "Triangulation of Data Source to Generate Coding". We have explored all these data and categorized them using the grounded theory method as shown in **Error! Reference source not found.**.

The coding paradigm of Boeije (2010) has been used as a mold for organizing the data. It consists of four discriminative elements: context, conditions, interaction/strategies and consequences. These categorized elements also satisfy the Mutually Exclusive And Collectively Exhaustive (MECE) condition as stated in research method. This process results in establishing four categories, which are "cooperative working behavior", "substantial reciprocal practices", "guidance collaborative process" and "conclusive common goals".

Figure 3. Constructing categorical theme of e-collaborative management on TLC
Source. Author.
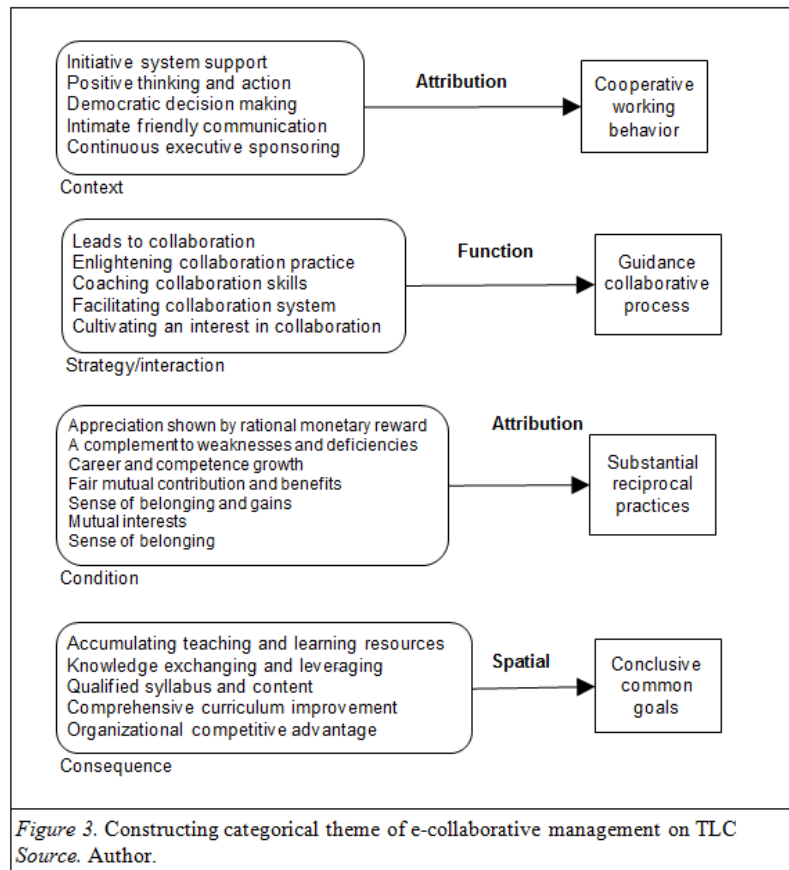
We further reduced the abovementioned four categories into two categories, which are "foster collective action practice" and "work toward common objectives". Please refer to Figure 4 for details. These two categories could establish "effective performance of e-collaborative management on TLC". The diagram illustrated in Figure 4 represents the model of this research.

Figure 4. e-Collaborative management on TLC Model.
Source. Authors.
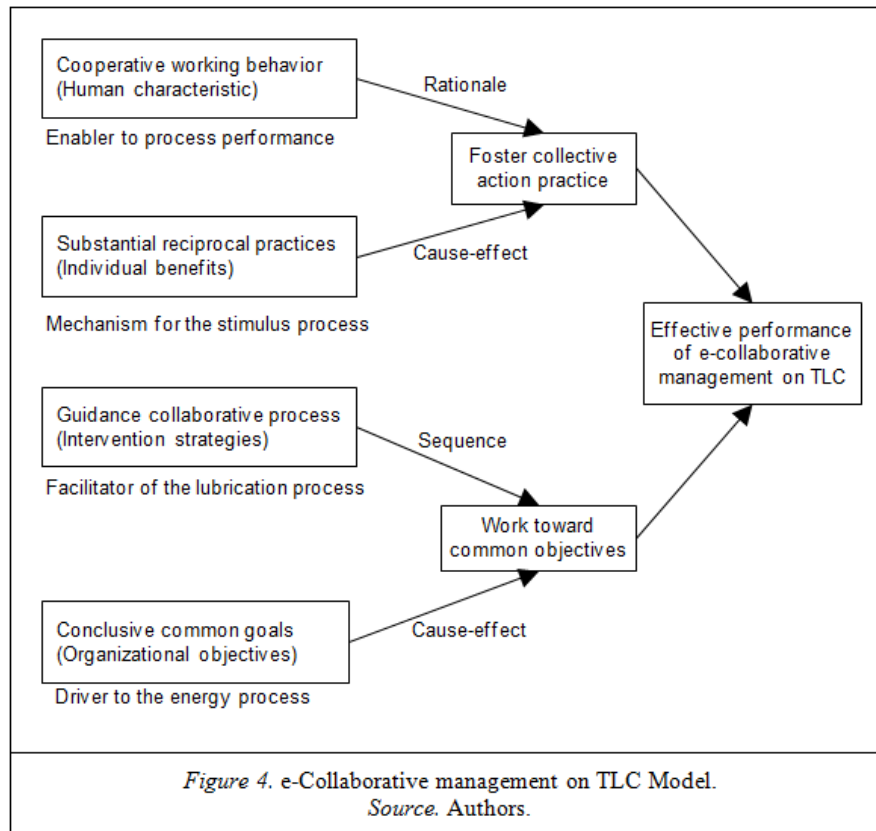
DISCUSSION AND CONCLUSION

These "cooperative working behavior", "substantial reciprocal practices", "guidance collaborative process" and "conclusive common goals" four factors model is more perspicuous and parsimonious than previous findings. The "substantial reciprocal practices" factor enhanced from integrated structures and process and rewards (Kezar & Lester, 2009). Next, the "cooperative working behavior" factor gives more insight on enthusiasm and commitment (Walsh & Kahn, 2010). Moreover, the "guidance collaborative process" factor comes straight to the point of facilitative leadership (Ansell & Gash, 2007). Furthermore, "conclusive common goals" is more fruitful than promising outcomes (Gray, 1989).

This research has uncovered the best theoretical, personal, and workplace-practical practices, as articulated by McNiff and Whitehead (2002). Theoretical practice is the minimizing of the gap between collaboration theory and practice through converting theoretical collaborative knowledge into new e-collaborative management practices for HEI and industrial organizations. There is double learning (Argyris, 1978) through doing the right e-collaborative management on TLC properly. The first comes from a review of the literature that has produced guidelines for e-collaborative management on TLC and subsequent reviews for reflections that provide improvement feedback. The second is achieved by doing a thing right from three consecutive practical improvements of PAR cycles. Then, this e-collaborative management on TLC model fine-tunes the theory into practice and lets the practitioner shorten the learning process.

The present study fills five types of knowledge gap in e-collaborative management on TLC. The knowledge-based gap to be filled in is HEI and other organization can build their organizational knowledge through this e-collaborative management on TLC model. The relationship-based gap to be filled in is conclusive common goals and substantial reciprocal practices factors enhance a sense of belonging among faculty colleagues and academic supporting colleagues (Jaitli & Hua, 2013) and have a centripetal force (Arroba & Wedgwood-Oppenheim, 1995). The methodological gap to be bridged is how PAR originality with regard to methodology is applied across different functional administrative departments and faculties in virtual working environments. The theory-based gap is filled by using grounded theory to analyze the PAR collected HEI colleagues' data. In doing so, this research has made use of grounded theory to develop a model of e-collaborative management on TLC that clarifies the correlation of collaborative factors, which filled the analytical gap.

The developed model illustrates how human perspective motivational factors can be utilized to promote e-collaborative management on TLC in the university college in particular and HEI in general. The first group of motivational factors comprise "cooperative working behavior", "guidance collaborative processes", "substantial reciprocal practices" and "conclusive common goals". They in turn foster "collective action practice" and "work toward common objectives". All of them make the effects of the whole greater than the sum of the parts (Shah, 2012). In addition, those factors generate competitive advantage when participants' empathy in the working relationship to generate enthusiasm and devotion in collaborative management is developed. For example, facilitators direct e-collaborative management into the right track, effort, performance, effect and pace; individual participants fulfill their own needs and career development; participants are encouraged to achieve e-collaborative management on TLC objectives whole-heartedly. Lastly, those factors inspire and improve HEI e-collaborative management on TLC practice through the four stages of envisioning, co-constructing, appreciating, and sustaining.

Today, e-collaborative management is becoming the most frequently employed form of management because the world is becoming smaller, human relationships are becoming more sophisticated, and an increasing amount of work needs to be accomplished in the virtual environment. Collaborative organizations that embrace social and collaborative technologies and strategies stand the best chances of succeeding as mentioned by Morgan (2012). Similarly, e-collaborative working is creating greater benefits than the sum total of individual work and its benefits can be shared by all (Shah, 2012). Last and most important e-collaborative management practice definitely sustains the effectiveness and efficiency of the electronic collaborative working environment (ECWE) and e-collaborative management. Therefore, this human focused e-collaborative management on TLC model is well worth considering by other researchers and practitioners for accomplishing e-collaborative management in various fields, organizations, or industries.

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Appendix

Triangulation of Data Source to Generate Coding

No.	Data Source	Transcripts use for significant statement (data reduction and induction)	Open encoding (conceptualize data)	Axial encoding (categorize data)
1	Interview; Observation	Moodle and SharePoint systems administrative colleagues had been trained and supported by Computer Centre colleagues actively.	Support systems' users	Initiative system support
	Interview; Observation	Computer Centre colleagues shall always offer substantial support and recommendation to both Moodle and SharePoint systems administrative colleagues and their end users.	Offering helpful system guidance	
	Observation; Data Mining	CITL colleagues proactively give assistance to novice lecturers when they face doubts and difficulties in using either the SharePoint or Moodle systems.	Proactively train novice users	
2	Observation	Computer Centre colleagues standing by to end users' complaints on inconvenience of accessing SharePoint system.	Alternative approaches	Positive thinking and action
	Interview; Observation	PDA colleagues recognize synchronized TLC updating saves time in compiling the syllabus handbook.	Appreciate others' effort	
	Observation	Computer Centre colleagues are continuously studying both CIMS and CIS to provide quality service.	Learn to make it viable	
3	Interview; Observation	Computer Centre colleagues suggested that any collective action taken needs to consider other people's convenience and benefits	Considering other position and interests	Democratic decision making
	Observation	Faculty colleagues offered feedback to Computer Centre colleagues and make decision together in order to work concurrently.	Consensus-building principle	
	Observation	CITL colleagues adapted their management approach after having learnt the knowledge from Computer Centre and Faculty.	Cooperate with others	
4	Observation; Reflection	Faculty and Computer Centre colleagues are building a rapport relationship with respect and openness while working together on TLC management.	Trust those with whom you have relationship	Intimate friendly communication
	Observation;	Faculty and CITL colleagues cohesively working	Cohesive work	

Reflection	on TLC delivery in the Moodle CIMS is increase their intimacy relationship	increasing intimacy
Interview; Observation	Computer Centre colleagues shall always notify PDA colleagues before adding a new item to the SharePoint CIS	Communicate with concerns

Appendix (continued)

No	Data Source	Transcripts use for significant statement (data reduction and induction)	Open encoding (conceptualize data)	Axial encoding (categorize data)
5	Observation; Data Mining	Top management instructed all lecturers regardless of their being full- or part-time that they must be prepared to conduct TLC before semester start.	Sponsoring TLC preparation	Continuous executive sponsoring
	Interview; Observation	Top management sponsored the facilitating session to enhance the creation of better TLC.	Reinforces quality TLC authoring	
	Observation; Data Mining	Top management helped to acquire a SharePoint server for centralized TLC preserving.	Provide funding for TLC preservation	
6	Observation	Deans and department heads lead colleagues to work together in order to keep TLC up-to-date	Leads collective action	Leads to collaboration
	Observation; Reflection	Collaborators acted as a bridge to communicate with various departments' colleagues.	Connects various departments	
	Interview; Observation	Deans and department heads become role models in knowledge exchange by sharing their TLC.	Serves as a role model for sharing knowledge	
7	Interview; Observation	CITL colleagues engaged student to help novice lecturers to create and develop TLC.	Encourages TLC development	Enlightening collaboration practice
	Interview; Observation	Faculty colleagues have their superiors as role model for e-collaborative management on TLC.	Offers practice on collaborative leadership	
	Observation	CITL colleagues used past and existing TLC as guide and the template to facilitate novice lecturer.	Is convenience to learn	
8	Observation	Colleagues are keen to cooperate and balance the workload of managing their TLC in SharePoint server.	Brainstorms to attain a collaborative approach	Coaching collaboration skills
	Observation; Data Mining	Train faculty colleagues to understand how SharePoint helps them reduce their workload.	Resolve mis-understandings	
	Interview; Observation	SharePoint is reduced colleagues' email communication and minimizing miscommunication.	Breakthrough collaborative barriers	
9	Interview; Reflection	A process that appreciated recognizes and rewards collaboration can reinforce a culture	Foster a collaborative	Facilitating collaboration

	of cooperation.	culture	system
Interview; Observation	The adoption of CIS eased online collaborative authoring, reviewing and updating.	Builds a capacity for collaboration	
Observation; Reflection	The context of collaboration fitted the organizational management structure, process and contents to ease cooperation.	Refining collaboration protocol	

Appendix (continued)

No	Data Source	Transcripts use for significant statement (data reduction and induction)	Open encoding (conceptualize data)	Axial encoding (categorize data)
10	Observation; Reflection	Most difficulties have immediately solved and better result attained when colleagues work together.	Attaining immediate gains through collaboration	Cultivating an interest in collaboration
	Interview; Observation	Showed colleagues the sense-making of collaboration benefits.	Demonstrates the benefits of collaboration	
	Reflection	Developed collaborative practice through mentoring to increase the strength of joint action in TLC management.	Develops joint force strengths	
11	Interview	Computer Centre colleagues suggested annual appraisal of collaboration efforts among cooperation colleagues.	Increase salary increments through appraisal	Appreciation shown by rational monetary reward
	Interview	CITL colleague suggested a special bonus be given to those colleagues who contribute input in TLC management.	Gives bonus for cooperative contributions	
	Interview	Faculty colleague proposed monetary incentive to those lecturers who actively assist others and share the faculty administrative workload.	Compensate for workload sharing	
	Interview	CITL colleagues recommended top management offer additional monetary incentive to those lecturers who developed attractive and quality TLC.	Give monetary incentive to the deserving	
12	Interview; Reflection	Computer Centre colleague recognized that they need to learn from each other to make SharePoint data sharing secure and reduce Exchange server workload.	Supplements deficiencies	A complement to weaknesses and deficiencies
	Interview; Observation	PDA colleagues acknowledged synchronized TLC updating saves time when compiling a syllabus handbook.	Compensates for weaknesses	
	Interview; Observation	Faculty colleagues admitted that collaborative TLC management can make reference and improve their TLC.	Compensates for insufficiency	
13	Interview; Observation	Faculty deans, department heads and CITL colleagues responded that collaborative TLC authoring advanced their personal knowledge and skills.	Improve individual capabilities	Career and competence growth

Interview; Observation	Faculty colleague acknowledged that their proficiency grew when they engaged in collaborative TLC management.	Proficiency grows mutually
Observation	Novice lecturers had chances to learn and create TLC from CITL colleagues when there is collaborative management of TLC.	Creates more opportunities

Appendix (continued)

No	Data Source	Transcripts use for significant statement (data reduction and induction)	Open encoding (conceptualize data)	Axial encoding (categorize data)
14	Interview	Faculty colleague hoped top management has mutual respect and appreciation for TLC being intellectual property.	Appreciate mutual contributions	Fair mutual contribution and benefits
	Interview; Observation	CITL and faculty colleagues have appreciated TLC sharing and the consultation that improved quality of curriculum delivery.	Appreciate cooperative efforts	
	Interview	Computer Centre colleagues mentioned that the reciprocate process encourages colleagues to help each other more and quickly attain better collaborative results.	Reciprocate mutual interests	
	Interview	Faculty colleagues admitted personal career objectives have to align themselves with faculty and HEI collaborative teaching goals	Resolve individual misunder-standings	
15	Interview	CITL colleagues stated that collaborative management of TLC cultivates a sense of belonging among teachers.	Build a sense of belonging	Sense of belonging and gains
	Interview; Observation	Faculty colleagues have a sense of being in the same boat and voluntarily helping others work collaboratively to enhance their faculty's TLC.	Creates a sense of being in the same boat	
	Observation; Data Mining	When CITL and faculty colleagues assisted each other to improve the teaching and learning context, it developed a curriculum quality and means of delivery that meet university college standards.	Encourages organizational membership behavior	
16	Interview; Observation	Faculty colleagues prepared and updated their TLC for review before conducting classes.	Readiness exists for TLC delivery	Accumulating teaching and learning resources
	Interview; Observation	Computer Centre, PDA, CITL and faculty colleagues agreed to standardize the TLC material on both Moodle and SharePoint servers.	Standardizes the organized TLC	
	Observation; Data Mining	Faculty colleagues utilized their PC's share folder to review their TLC before uploading to Moodle for delivery and SharePoint for academic e-portfolio preservations.	Securing TLC preservations	
17	Interview	Faculty colleagues noted that various professional sharing, discussing and amending TLC enhance their skills and knowledge.	TLC sharing leverages knowledge	Knowledge exchanging and leveraging

Observation; Data Mining	Faculty colleagues acquired the best TLC samples and templates to learn how best to improve continuously their TLC presenting to students.	TLC benchmarking brings important advantages
Observation	Faculty and CITL colleagues collaborative authored and developed TLC, and then collaboratively teach and learn for conducting the lessons.	Improves collaborative teaching and learning

Appendix (continued)

No	Data Source	Transcripts use for significant statement (data reduction and induction)	Open encoding (conceptualize data)	Axial encoding (categorize data)
18	Interview; Observation	Faculty colleagues frequently updated their subjects' portfolio according to market requirements, which enriched TLC contents and its delivery.	Provide adequate development of TLC	Qualified syllabi and content
	Interview; Observation	Faculty colleagues' draft improved and delivered their TLC according to syllabus requirement established by MQA.	TLC satisfy quality audits	
	Interview; Observation; Data Mining	CITL colleagues accepted recommendation from faculty colleagues to standardize TLC folders names and its structure for ease access.	Presenting organized TLC	
19	Interview; Observation	Standardize subject names are established for easier locating by faculty colleagues and students.	Collaborative TLC updating	Comprehensive curriculum improvement
	Interview; Observation; Data Mining	Deans and department heads needed to review lecturers' weekly TLC before the semester starts.	Benchmarking helps create quality TLC	
	Observation; Data Mining	Faculty colleagues aggressively reviewed and updated their TLC to make them excellent for curriculum delivery.	Enhance TLC through regular review	
	Observation; Data Mining	CITL colleagues conducted a TLC drafting, developing, and updating workshop for all lecturers.	Training for TLC crafting	
20	Observation	The HEI group of talents from various departments provided their skills and knowledge to collaborative TLC management.	Differentiated collaborative management	Organizational competitive advantages
	Interview; Observation	Faculty colleagues suggested that cohesive effort to proliferate TLC content and delivery.	Collaboration enhancing capacity	
	Interview	CITL colleague acknowledged that those TLC created during office hours should be considered as HEI intellectual property and assets.	Accumulates organizational advantage	

Source. Author.